

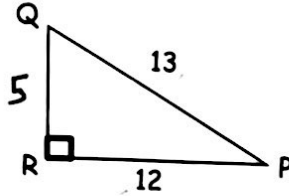
1. Find the value of each ratio:

$$13^2 = 12^2 + 5^2$$

a. $\sin Q = 12/13$

b. $\cos Q = 5/13$

c. $\tan Q = 12/5$



d. $\sin P = 5/13$

e. $\cos P = 12/13$

f. $\tan P = 5/12$

2. Evaluate each of the following with your calculator. Round to 3 decimal places.

a. $\cos 62^\circ = .469$

b. $\tan 14^\circ = .249$

c. $\sin 27^\circ = .454$

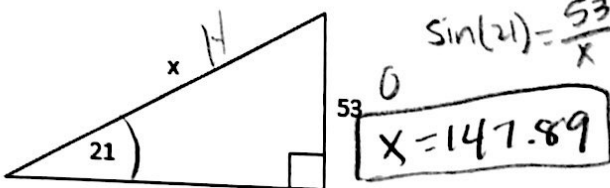
d. $\sin^{-1} .8732 = 60.833$

e. $\cos^{-1} .2315 = 76.615$

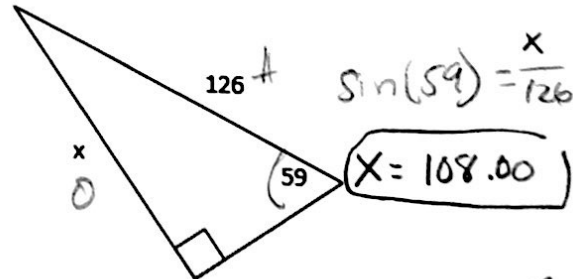
f. $\tan^{-1} 2.143 = 64.985$

3. Find each indicated length or angle measure to the nearest hundredth.

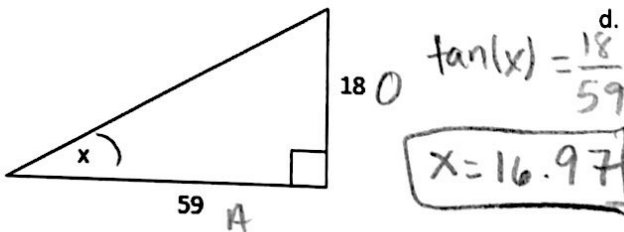
a.



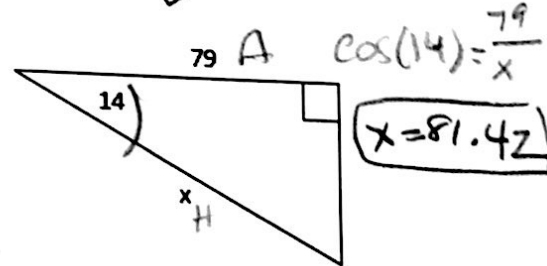
b.



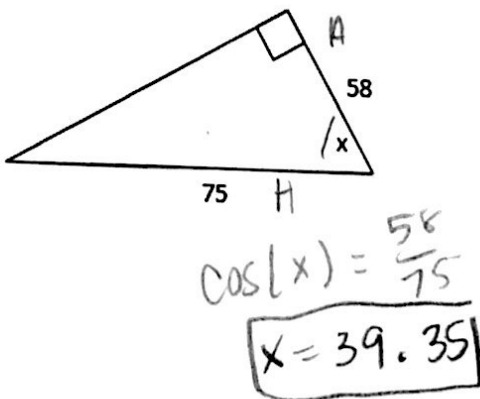
c.



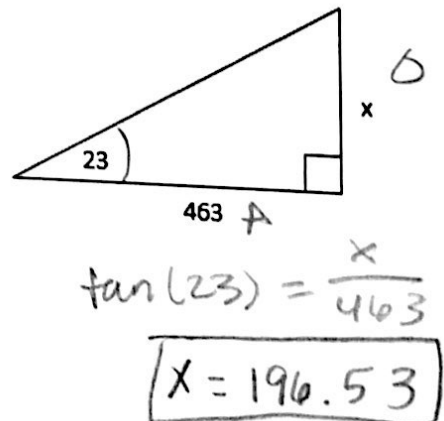
d.



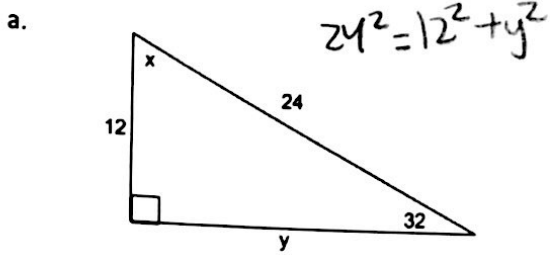
e.



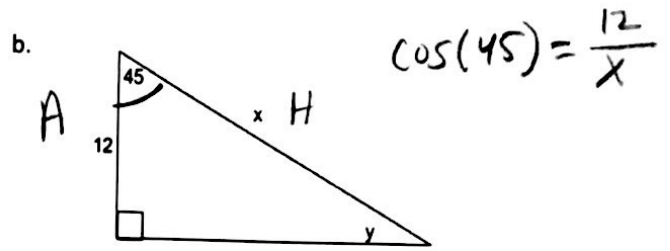
f.



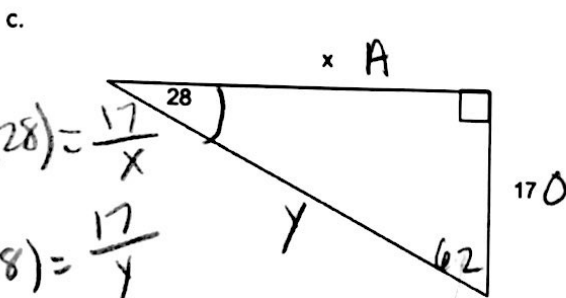
6. Solve for the missing sides or angles using any method (Pythagorean Theorem, triangle sum theorem, special right triangles, right triangle trig).



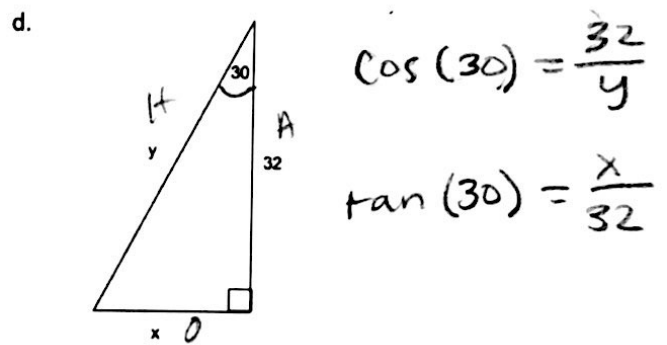
x: 58 y: 20.78



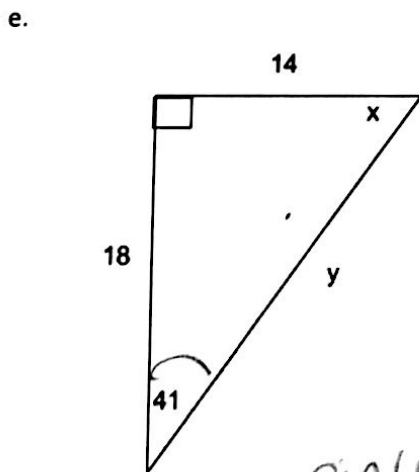
x: 16.97 y: 45



x: 31.97 y: 36.21

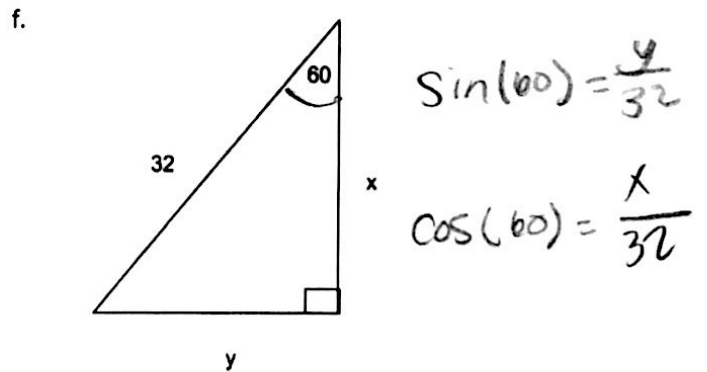


x: 18.48 y: 36.95



$\sin(41) = \frac{14}{y}$

x: 49 y: 21.34



$\sin(60) = \frac{y}{32}$
 $\cos(60) = \frac{x}{32}$

x: 16 y: 27.71

4. Draw a picture for each problem. Then find the indicated value. Round answers to the nearest tenth.

- a. From the top of a tower 60 ft high, the angle of depression to an object on the ground is 58° . Find the distance from the object to the base of the tower to the nearest tenth of a foot.

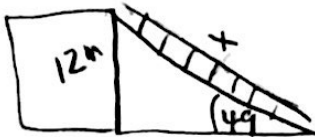


$$\tan(58) = \frac{60}{x}$$

$$x = 60 / \tan(58)$$

$$x = 37.5 \text{ ft}$$

- b. A ladder that leans against a building makes an angle of 49° with the ground and reaches a point on the building 12 m above the ground. Find the length of the ladder to the nearest tenth of a meter.

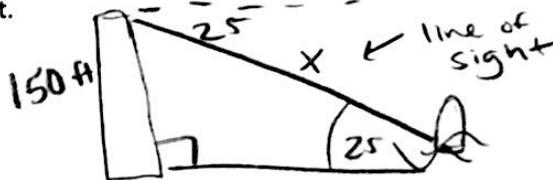


$$\sin(49) = \frac{12}{x}$$

$$x = 12 / \sin(49)$$

$$x = 15.9 \text{ m}$$

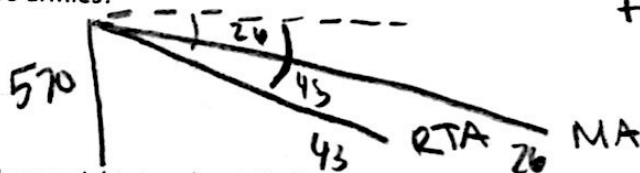
- c. From the top of a lighthouse, the angle of depression to a buoy is 25° . If the top of the lighthouse is 150 feet above sea level, find the distance of the line of sight (from the top of the lighthouse to the buoy) to the nearest tenth of a foot.



$$\sin(25) = \frac{150}{x}$$

$$x = 354.93 \text{ ft}$$

- d. While standing on top of the San Jacinto Monument (570 feet off the ground) during a reenactment, Travis spots the Mexican Army at an angle of depression of 26° . Directly between the Mexican Army and the base of the monument that Travis is standing on is the Republic of Texas Army at an angle of depression of 43° . How far apart are the two armies?



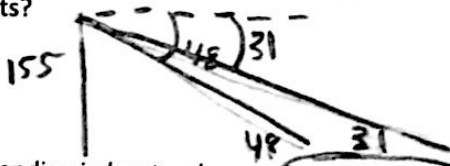
$$\tan(26) = \frac{570}{y} \quad \tan(43) = \frac{570}{z}$$

$$y = 1168.67 \quad z = 611.25$$

$$x = y - z$$

$$x = 557.42 \text{ ft}$$

- e. A man in a lighthouse sights two boats in the water 155 feet below. If the angle of depression from the man to the first boat is 48° and the angle of depression from the man to the second boat is 31° , how far apart are the two boats?



$$\tan(31) = \frac{155}{y}$$

$$\tan(48) = \frac{155}{z}$$

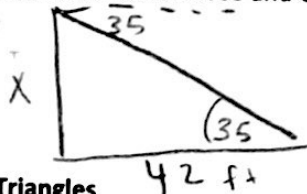
$$y = 257.96$$

$$z = 139.56$$

$$x = y - z$$

$$x = 118.40 \text{ ft}$$

- f. While standing in her treehouse, Georgia spotted a deer at a 35° angle of depression. If the deer is 42 feet from the base of the treehouse and Georgia is approximately 3.5 feet tall, how high is the treehouse?



$$\tan(35) = \frac{x}{42}$$

$$x = 29.41$$

$$x = 29.41 - 3.5 = 25.91 \text{ ft}$$

5. Special Right Triangles

What is the rule for a 30-60-90 triangle? $x - x\sqrt{3} - 2x$

What is the rule for a 45-45-90 triangle? $x - x - x\sqrt{2}$